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COROLLARY. Let $\alpha = \frac{1}{2}\pi$; then $\Delta = \frac{b^2}{2\pi}$, the same as problem 26.

[NOTE.—By mistake in numbering the problems in this department, number 28 was omitted. The above problem and solution are inserted that problems be numbered consecutively. EDITOR.]

29. Proposed by JOHN DOLMAN, Jr., Philadelphia, Pennsylvania.

Neglecting perturbations, what is the average distance of the earth from the sun?

Solution by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics and Astronomy, Ohio University, Athens, Ohio.

The focus being the pole, the polar equation to the ellipse is

$$r = \frac{a(1-e^2)}{1-e\cos\theta} \dots \dots \dots (1).$$

I. The radii vectores being drawn at equal angular intervals,

$$m' = \frac{\int r d\theta}{\int d\theta} = a(1-e^2) \frac{\int_0^\pi \frac{d\theta}{1-e\cos\theta}}{\int_0^\pi d\theta} = a\sqrt{1-e^2} = b.$$

II. If x be the abscissa of any point on the curve, the focal distance is

$$r = a - ex \dots \dots \dots (2),$$

$$\text{and } m'' = \frac{\int_{-a}^{+a} (a-ex) dx}{\int_{-a}^{+a} dx} = a,$$

the points on the curve being so taken that their abscissas increase uniformly.

III. If the number of radii vectores depends upon the length of the curve,

$$m''' = \frac{\int r ds}{\int ds},$$

ds being an element of the curve.

Also solved as I. above by Profs. F. P. MATZ, and O. W. ANTHONY, and as III. by Prof. G. B. M. ZERR.

PROBLEMS.

37. Proposed by HENRY HEATON, M. Sc., Atlantic, Iowa.

Required the average area of all triangles two of whose sides are a and b .